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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MCMAHON, MARGUERITE J

ART UNIT PAPER NUMBER

3747

DATE MAILED: 05/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/726,651

Applicant(s)

ROBELET, MARC

Examiner

Marguerite J. McMahon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Drawings

Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kruse (6,286,414) in view of Tausig et al (6,311,759) or Uggowitzer et al (6,547,896). Kruse shows a one-piece steel piston formed by forging, the piston including a skirt 96 with openings for lugs 44, which are provided on the base of the internal cavity of the piston and provided with holes to accommodate the piston pin (48 is at the center of the holes). See Figures 3 and 4. Kruse shows everything except utilizing thixoforging as the method of forming. Tausig et al and Uggowitzer et al show

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that it is old in the engine art to utilize thixoforging to form parts which were previously formed by conventional forging methods. Tausig et al describes the process of thixoforging an engine part such as a clutch hub. Uggowitzer et al recite at column 1, lines 10-20 the following: "The forming of metal alloys in the semi-solid state by means of thixocasting, thixoforging or thixopressure injection is gaining significance as an alternative to the classic methods for producing formed pieces by means of casting, forging, and pressure injection. Thus, it is now possible to start with a material in the semi-liquid/semi-solid state...to manufacture cast or forged structural components that meet high quality demands. Particularly when it comes to the production of heavy-duty, lightweight metal formed pieces with a complex geometry, forming in the semi-solid state offers great economic advantages." It would have been obvious to one having ordinary skill in the art to adapt the process of thixoforging as an alternative to the conventional process of manufacturing a piston by forging. Pistons formed by forging are conventional, and the process of utilizing the process of thixoforging is a well known alternative to forging. Thus there is no inventive step involved in adapting this well known process which serves as a functional alternative to the conventional process of forging. With respect to claim 5, the utilization of reinforcing ribs would have been an obvious matter of design choice, since reinforcing ribs are conventional.

Claims 6-14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kruse (6,286,414) in view of Tausig et al (6,311,759) or Uggowitzer et al (6,547,896), and further in view of Winter et al (4,457,355). Kruse (6,286,414) in view of Tausig et al (6,311,759) or Uggowitzer et al (6,547,896) show everything except a long

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list of materials cited as various alternatives, which may be utilized in the process of thixoforging the piston. Winter et al mention some of those materials as possibilities for thixoforging process at column 11, lines 60-64, which recite: "The process and apparatus of this invention is applicable to the full range of materials as set forth in the prior art including but not limited to aluminum and its alloys, copper and its alloys and steel and its alloys." Thus, it would have been obvious to one having ordinary skill in the art to utilize the various elements cited in claims 6-14 and 14, as these are art recognized alternatives, known for the same purpose as evidenced by Winter et al and by the specification, which states at page 3 that these various elements **may** or **can** be used and on page 4, lines 13-14, that it is to be "understood that other alloys could be suitable for the manufacture of pistons by thixoforging".

Response to Arguments

Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection. It is to be noted, however, that applicant's arguments were directed to the fact that the previously applied reference (EPO 2000-186616) showed a piston formed by thixocasting as opposed to thixoforging. According to Tausig et al (6,311,759): "While there seems to be some difficulty in literature and the industry in drawing a clear line between thixocasting and thixoforging processes, there is a clear distinction between thixoforging and conventional metal processing (e.e. casting and forging). Thixoforging is a new development in metal shaping processes in that the metal is being shaped in its partially solid, partially liquid (i.e. semisolid) state, rather than in the fully liquid (casting)

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or fully solid (forging) state.” Thus, the difference between thixocasting and thixoforging is not as clear-cut as applicant has argued. Given the similarity between the two processes, it is not clear what, if any, distinctions are found between the characteristics of the products formed by these processes.

In addition, the claims are product by process claims. Product by process claims are NOT limited to the manipulations of the recited steps, only to the structure implied by the steps. However, the structure implied by the steps should be considered when assessing the patentability of product by process claims where the manufacturing process steps would be expected impart distinctive structural characteristics to the final product. The claims do not make clear what those distinctive structural characteristics are although it is noted that the specification mentions that the piston walls may be thinner than in conventionally formed pistons. It appears that this characteristic would also be found in the thixocast pistons shown in the EPO 2000-186616 reference.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Note the abstract of a conference paper by Yokohama, which appears to indicate that thixoforging was utilized to form a piston part. The translation is a little unclear, which was why the reference was not utilized in the above rejection. Note also the Pryor et al reference, which employs thixoforging and the forged piston of Abraham, Sr. et al.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marguerite J. McMahon whose telephone number is 703-308-1956. The examiner can normally be reached on flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yuen Henry can be reached on 703-308-1946. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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MARGUERITE MCMAHON
PRIMARY EXAMINER